WHAT IS CLAIMED IS:

1.   A method for encoding motion vectors comprising:

(a) predicting a motion vector of a type identical to that of a motion vector of a present block and obtaining a predictive motion vector with respect to neighbor blocks having motion vectors of a type different from that of the present block among a plurality of neighbor blocks adjacent to the present block;

(b) calculating a representative value of the motion vector of a type identical to that of the present block from the motion vectors of the neighbor blocks and the predictive motion vector;

(c) calculating a difference value between the calculated representative value and the motion vector of the present block; and

(d) encoding the calculated difference value.

2.   The encoding method according to claim 1, wherein the plurality of neighbor blocks include blocks which are to the left of, above, and to the upper-right of the present block.

3.   The encoding method according to claim 2, wherein the left block is a block including a pixel adjacent to and to the left of the left-most pixel in the first row of the present block, the upper block is a block including

a pixel adjacent to and above the left-most pixel, and the upper-right block is a block including a pixel adjacent to and to the right of a pixel adjacent to and above the right-most pixel in the first row of the present block.

4.   An apparatus for encoding motion vectors comprising:

a motion vector predictor that predicts a motion vector of a type identical to that of a motion vector of a present block and produces a predictive motion vector with respect to neighbor blocks having motion vectors of a type different from that of the present block among a plurality of neighbor blocks adjacent to the present block, and calculates a representative value of the motion vector of the type identical to that of the present block from the motion vectors of the neighbor blocks and the predictive motion vector and calculates a difference value between the calculated representative value and the motion vector of the present block; and

a motion vector encoder for encoding the calculated difference value.

5.   The encoding apparatus according to claim 4, wherein said motion vector predictor calculates a predictive forward motion vector $MVf(predictive)$ as the predictive motion vector, when the motion vector of the present block is a forward motion vector MVf and the motion vector of

the neighbor block is a backward motion vector *MVb*, according to the following equation:

$$MVf(predictive) = \frac{d1}{d2-d1} \times MVb$$

where $d1$ is a distance between a present picture to which the neighbor block belongs and a previous picture to which the neighbor block refers, and $d2$ is a distance between a following picture to which the neighbor block refers and the previous picture to which the neighbor block refers.

6.   The encoding apparatus according to claim 4, wherein said motion vector predictor calculates a predictive backward motion vector *MVb(predictive)* as the predictive motion vector, when the motion vector of the present block is a backward motion vector *MVb* and the motion vector of a neighbor block is a forward motion vector *MVf*, according to the following equation:

$$MVb(predictive) = \frac{d2-d1}{d1} \times MVf$$

where $d1$ is a distance between a present picture to which the neighbor block belongs and a previous picture to which the neighbor block refers, and $d2$ is a distance between a following picture to which the neighbor block refers and the previous picture to which the neighbor block refers.

7.　The encoding apparatus according to claim 4, wherein said motion vector predictor calculates a predictive value PMV_X as the representative value according to the following equation:

$$PMV\_X = median(MVf\_A, MVf\_B, MVf\_C) \ or \ median(MVb\_A, MVb\_B, MVb\_C)$$

where $MVf\_A, MVf\_B, MVf\_C, MVb\_A, MVb\_B$, and MVb_C are components of motion vectors of neighbor blocks in which MVf_A is a forward motion vector of a left block, MVf_B is a forward motion vector of an upper block, MVf_C is a forward motion vector of an upper-right block, MVb_A is a backward motion vector of a left block, MVb_B is a backward motion vector of an upper block, and MVb_C is a backward motion vector of an upper-right block, and one of these vectors can be the predictive motion vector.

8.　The encoding apparatus according to claim 7, wherein said motion vector predictor calculates a differential value between the calculated representative value and the motion vector of the present block.

9.　The encoding apparatus according to claim 8, wherein said motion vector predictor encodes the differential value.

10.   A method for decoding motion vectors comprising:

(a) predicting a motion vector of a type identical to that of a present block and obtaining a predictive motion vector with respect to neighbor blocks having motion vectors of a type different from that of the present block among a plurality of neighbor blocks adjacent to the present block;

(b) calculating a representative value of the motion vector of the type identical to that of the present block from the motion vectors of the neighbor blocks and the predictive motion vector; and

(c) calculating the motion vector of the present block by adding the calculated representative value and a decoded difference value.

11.   The decoding method according to claim 10, wherein the plurality of neighbor blocks include blocks which are to the left of, above, and to the upper-right of the present block.

12.   The decoding method according to claim 11, wherein the left block is a block including a pixel adjacent to and to the left of the left-most pixel in a first row of the present block, the upper block is a block including a pixel adjacent to and above the left-most pixel, and the upper-right block is a block including a pixel adjacent to and to the right of a pixel adjacent to and above of the right-most pixel in the first row of the present block.

13.   The decoding method according to claim 10, wherein the representative value is a median value.

14.   The decoding method according to claim 10, wherein a predictive forward motion vector $MVf(predictive)$ is calculated as the predictive motion vector, when the motion vector of the present block is a forward motion vector MVf and the motion vector of the neighbor block is a backward motion vector MVb, according to the following equation:

$$MVf(predictive) = \frac{t1}{t2 - t1} \times MVb$$

where $t1$ is a time difference between a present picture to which the neighbor block belongs and a previous picture to which the neighbor block refers, and $t2$ is a time difference between a following picture to which the neighbor block refers and the previous picture to which the neighbor block refers.

15.   The decoding method according to claim 10, wherein a predictive backward motion vector $MVb(predictive)$ is calculated as the predictive motion vector, when the motion vector of the present block is a backward motion vector MVb and the motion vector of a neighbor block is a forward motion vector MVf, according to the following equation:

$$MVb(predictive) = \frac{t2 - t1}{t1} \times MVf$$

where $t1$ is a time difference between a present picture to which the neighbor block belongs and a previous picture to which the neighbor block refers, and $t2$ is a time difference between a following picture to which the neighbor block refers and the previous picture to which the neighbor block refers.

16.   The decoding method according to claim 10, wherein a predictive forward motion vector $MVf(predictive)$ is calculated as the predictive motion vector, when the motion vector of the present block is a forward motion vector MVf and the motion vector of the neighbor block is a backward motion vector MVb, according to the following equation:

$$MVf(predictive) = \frac{d1}{d2 - d1} \times MVb$$

where $d1$ is a distance between a present picture to which the neighbor block belongs and a previous picture to which the neighbor block refers, and $d2$ is a distance between a following picture to which the neighbor block refers and the previous picture to which the neighbor block refers.

17.   The decoding method according to claim 10, wherein a predictive backward motion vector $MVb(predictive)$ is calculated as the predictive motion vector, when the motion vector of the present block is a

backward motion vector *MVb* and the motion vector of a neighbor block is a forward motion vector *MVf* , according to the following equation:

$$MVb(predictive) = \frac{d2 - d1}{d1} \times MVf$$

where *d*1 is a distance between a present picture to which the neighbor block belongs and a previous picture to which the neighbor block refers, and *d*2 is a distance between a following picture to which the neighbor block refers and the previous picture to which the neighbor block refers.

18.   The decoding method according to claim 10, wherein step (b) includes calculating a predictive value PMV_X for decoding as the representative value according to the following equation:

$PMV\_X = median(MVf\_A, MVf\_B, MVf\_C)$ or $median(MVb\_A, MVb\_B, MVb\_C)$

where $MVf\_A, MVf\_B, MVf\_C, MVb\_A, MVb\_B$, and MVb_C are components of motion vectors of neighbor blocks in which MVf_A is a forward motion vector of a left block, MVf_B is a forward motion vector of an upper block, MVf_C is a forward motion vector of an upper-right block, MVb_A is a backward motion vector of a left block, MVb_B is a backward motion vector of an upper block, and MVb_C is a backward motion vector of

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an upper-right block, and one of these vectors can be the predictive motion
vector.

19.   The decoding method according to claim 10, wherein step (c)
includes adding a differential value between the representative value and the
motion vector of the present block.

20.   An apparatus for decoding motion vectors comprising:

a motion vector decoder for decoding a difference value; and

a motion vector prediction compensator which predicts a motion vector
of a type identical to that of a motion vector of a present block and obtaining a
predictive motion vector with respect to neighbor blocks having motion
vectors of a type different from that of the present block among a plurality of
neighbor blocks adjacent to the present block, calculates a representative value
of the motion vector of the type identical to that of the present block from the
motion vectors of the neighbor blocks and the predictive motion vector and
calculates the motion vector of the present block by adding the calculated
representative value and the decoded difference value.

21.   The decoding apparatus according to claim 20, wherein the plurality of neighbor blocks include blocks which are to the left of, above, and to the upper-right of the present block.

22.   The decoding apparatus according to claim 21, wherein the left block is a block including a pixel adjacent to and to the left of the left-most pixel in a first row of the present block, the upper block is a block including a pixel adjacent to and above the left-most pixel, and the upper-right block is a block including a pixel adjacent to and to the right of a pixel adjacent to and above of the right-most pixel in the first row to which the present block belongs.

23.   The decoding apparatus according to claim 20, wherein the representative value is a median value.

24.   The decoding apparatus according to claim 20, wherein said motion vector prediction compensator calculates a predictive forward motion vector $MVf(predictive)$ as the predictive motion vector, when the motion vector of the present block is a forward motion vector MVf and the motion vector of the neighbor block is a backward motion vector MVb, according to the following equation:

$$MVf(predictive) = \frac{t1}{t2 - t1} \times MVb$$

where $t1$ is a time difference between a present picture to which the neighbor block belongs and a previous picture to which the neighbor block refers, and $t2$ is a time difference between a following picture to which the neighbor block refers and the previous picture to which the neighbor block refers.

25.   The decoding apparatus according to claim 20, wherein said motion vector prediction compensator calculates a predictive backward motion vector $MVb(predictive)$ as the predictive motion vector, when the motion vector of the present block is a backward motion vector MVb and the motion vector of a neighbor block is a forward motion vector MVf, according to the following equation:

$$MVb(predictive) = \frac{t2 - t1}{t1} \times MVf$$

where $t1$ is a time difference between a present picture to which the neighbor block belongs and a previous picture to which the neighbor block refers, and $t2$ is a time difference between a following picture to which the neighbor block refers and the previous picture to which the neighbor block refers.

26.   The decoding apparatus according to claim 20, wherein said motion vector prediction compensator calculates a predictive forward motion

vector $MVf(predictive)$ as the predictive motion vector, when the motion vector of the present block is a forward motion vector MVf and the motion vector of the neighbor block is a backward motion vector MVb, according to the following equation:

$$MVf(predictive) = \frac{d1}{d2-d1} \times MVb$$

where $d1$ is a distance between a present picture to which the neighbor block belongs and a previous picture to which the neighbor block refers, and $d2$ is a distance between a following picture to which the neighbor block refers and the previous picture to which the neighbor block refers.

27.   The decoding apparatus according to claim 20, wherein said motion vector prediction compensator calculates a predictive backward motion vector $MVb(predictive)$ is calculated as the predictive motion vector, when the motion vector of the present block is a backward motion vector MVb and the motion vector of a neighbor block is a forward motion vector MVf, according to the following equation:

$$MVb(predictive) = \frac{d2-d1}{d1} \times MVf$$

where $d1$ is a distance between a present picture to which the neighbor block belongs and a previous picture to which the neighbor block refers, and $d2$ is a

distance between a following picture to which the neighbor block refers and the previous picture to which the neighbor block refers.

28.   The decoding apparatus according to claim 20, wherein said motion vector prediction compensator calculates a predictive value PMV_X for decoding as the representative value according to the following equation:

$$PMV\_X = median(MVf\_A, MVf\_B, MVf\_C) \text{ or } median(MVb\_A, MVb\_B, MVb\_C)$$

where $MVf\_A, MVf\_B, MVf\_C, MVb\_A, MVb\_B$, and MVb_C are components of motion vectors of neighbor blocks in which MVf_A is a forward motion vector of a left block, MVf_B is a forward motion vector of an upper block, MVf_C is a forward motion vector of an upper-right block, MVb_A is a backward motion vector of a left block, MVb_B is a backward motion vector of an upper block, and MVb_C is a backward motion vector of an upper-right block, one of these vectors can be the predictive motion vector.